

MILESTONE PRESENTATION

– Dumping to gather –

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Outline

1. General Introduction and Motivation
2. General Team Strategy Concept
3. Implementation Concept
4. Current State
5. Team Structure

1. Motivation

- Multi-agent approaches can provide robustness, scalability and flexibility for complex systems
- Thus, they are becoming increasingly important

1. Introduction - Multi-Agent Programming Contest

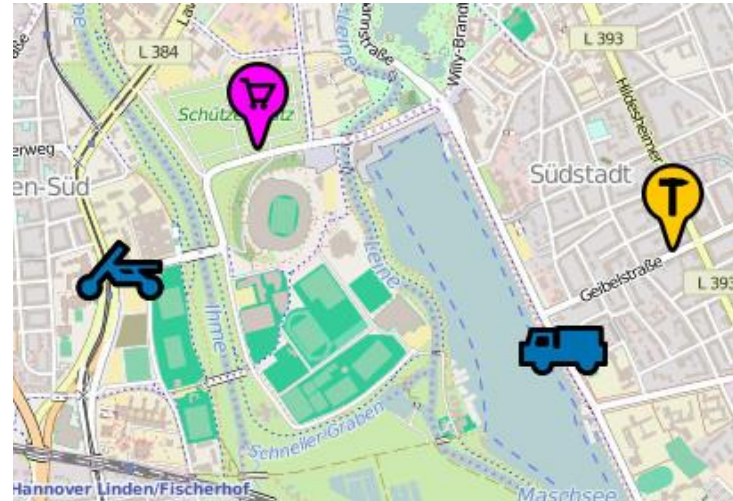
- Multiple agents moving through the city
 - After completion of certain task, agents win money so they can build wells
 - Types of jobs:
 - regular jobs
 - auctions
 - Missions
- **Main goal:** Earn as many points as possible by building wells

1. Introduction - Multi-Agent Programming Contest

- Agents :
 - Drones
 - Motorcycles
 - Cars
 - Trucks
- Characterization of agents:
 - Battery
 - Capacity
 - Speed
 - Vision
 - Skill

1. Introduction - Multi-Agent Programming Contest

- Position randomly selected on map for agents along with
 - Shops
 - Charging stations
 - Workshops
 - Resource nodes
 - Storage facilities
 - Dumps



2. General Team Strategy Concept



Exploration

- Grid exploration
- Share agents exploration goals
→ each grid point is only explored once
- Passive exploration



Sharing

- Items
- Facilities
- Wells
- Agents



Defining roles

- Drones
→ exploration
→ well-building
- Trucks
→ resource gathering



Massium

- consideration of ongoing investments for wells and upgrading
- reserve massium a priori before usage

2. General Team Strategy Concept



Auctioning

- Auctioneer starts auction for all agents
- Auction request is send in stages
- Auctioneer chooses agent depending on the provided information
- Checking profitability of a job
- Each bidder plans how a task could be done
 - sending plan results
- Auctioneer receives updates on jobs and tasks while they're being done



Items

- hoard items in trucks, but don't assemble in advance
- reserve items a priori before usage
- priority how to handle exhausted agent capacity:
store in truck > store in storage
> upgrade load > sell > dump



Jobs

- Cost-benefit calculation: take into account reward, fine, steps
- Consider abortion of jobs due to profitability or impossibility
- Decomposition of jobs

2. General Team Strategy Concept



Charging

- if agent is in idle mode
→ enabled by linear charge activator
- if agent is executing a plan
→ charging implicit given in precalculated route



Failure

- Add 1 duration step to all current plan and update other plan durations if necessary
- Send a status update to auctioneer and bidder node



Idle time

- priority all except trucks:
build (drones) / dismantle wells > store unallocated items in trucks > gather resources > charge > upgrade speed & charge
- priority trucks:
gather resources > upgrade skill

2. General Team Strategy Concept



Upgrades

- perform speed and vision upgrades before exploration
→ drones
- perform skill upgrades before well-building and resource gathering
→ drones
→ trucks
- perform battery and speed upgrades in idle time or if a task can't be done in time
→ all except trucks



Wells

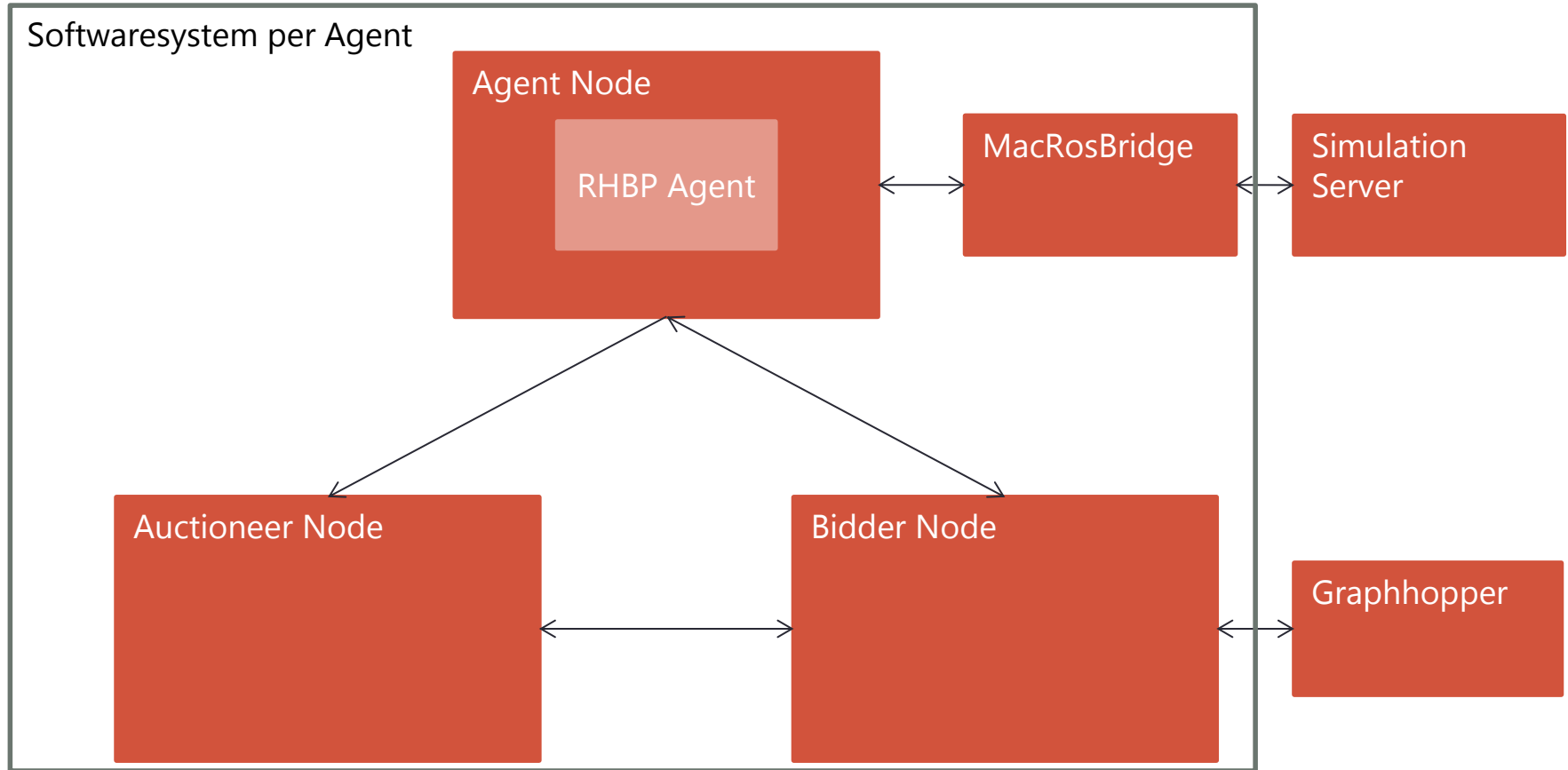
- place wells at the map borders, because there's less traffic
- build well-type with most score generation in lifetime

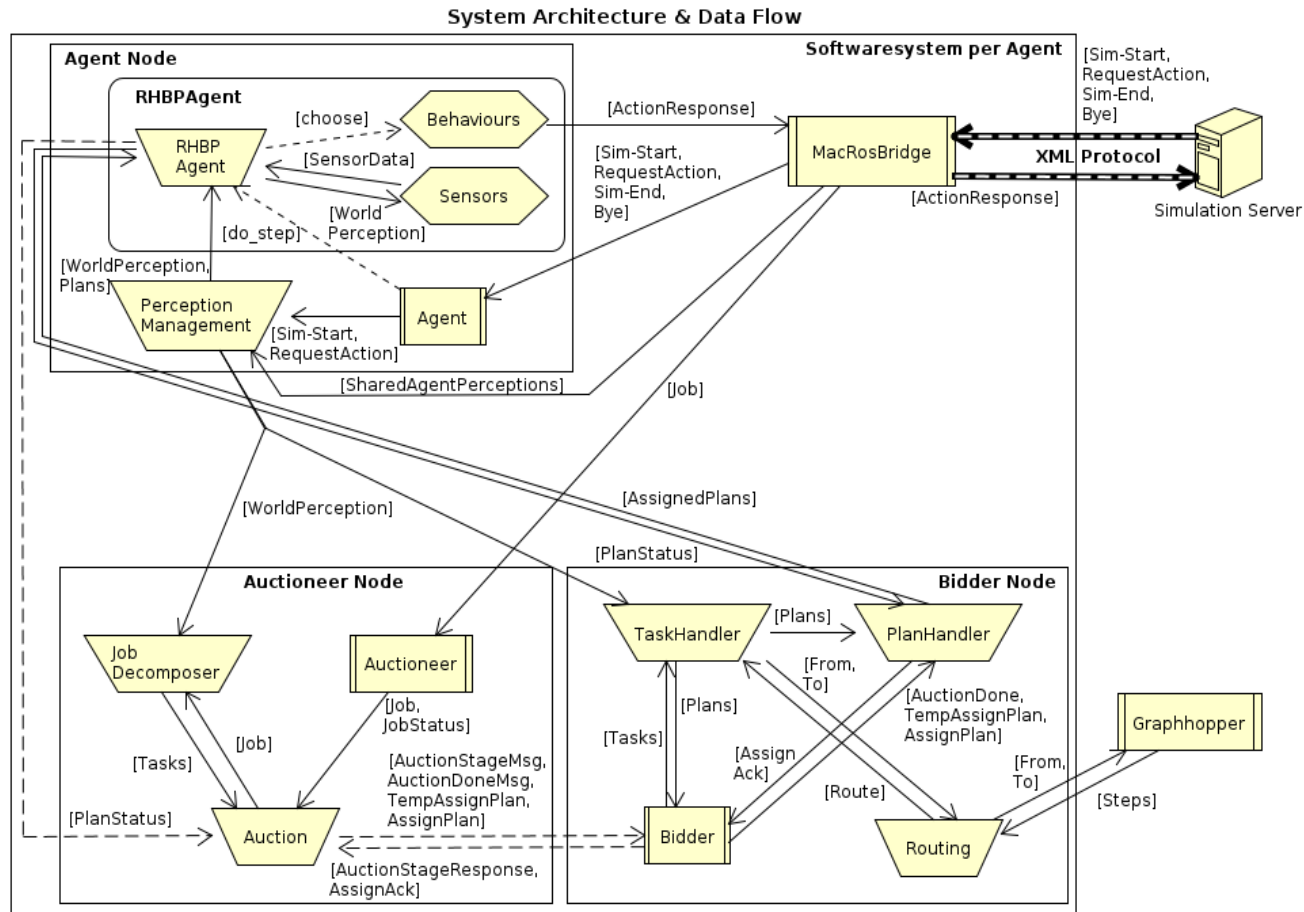


Disconnection

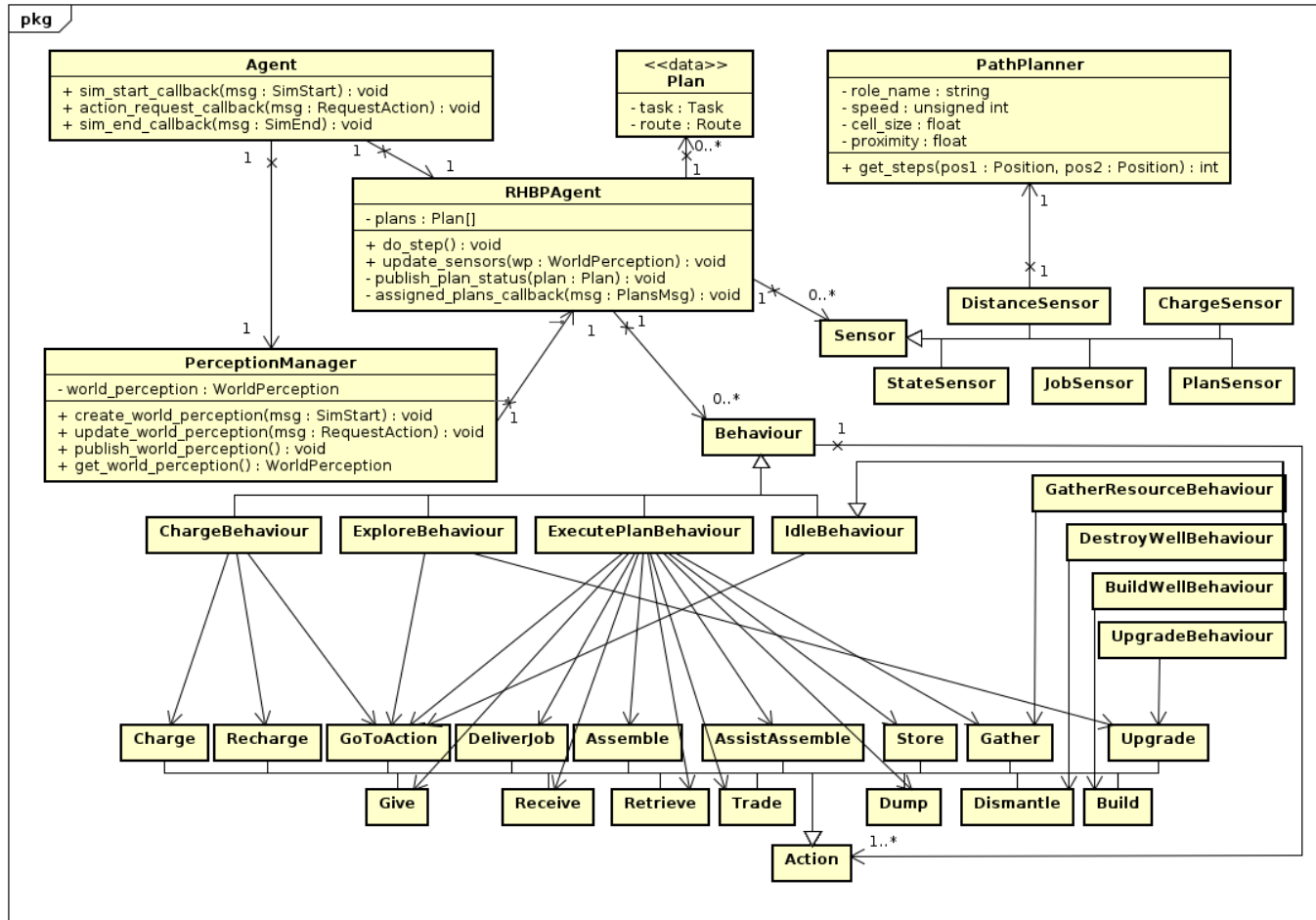
- rhbp planner takes control after reconnecting
- request world perception at other agents perception manager if necessary

3. Implementation Concept – General approach

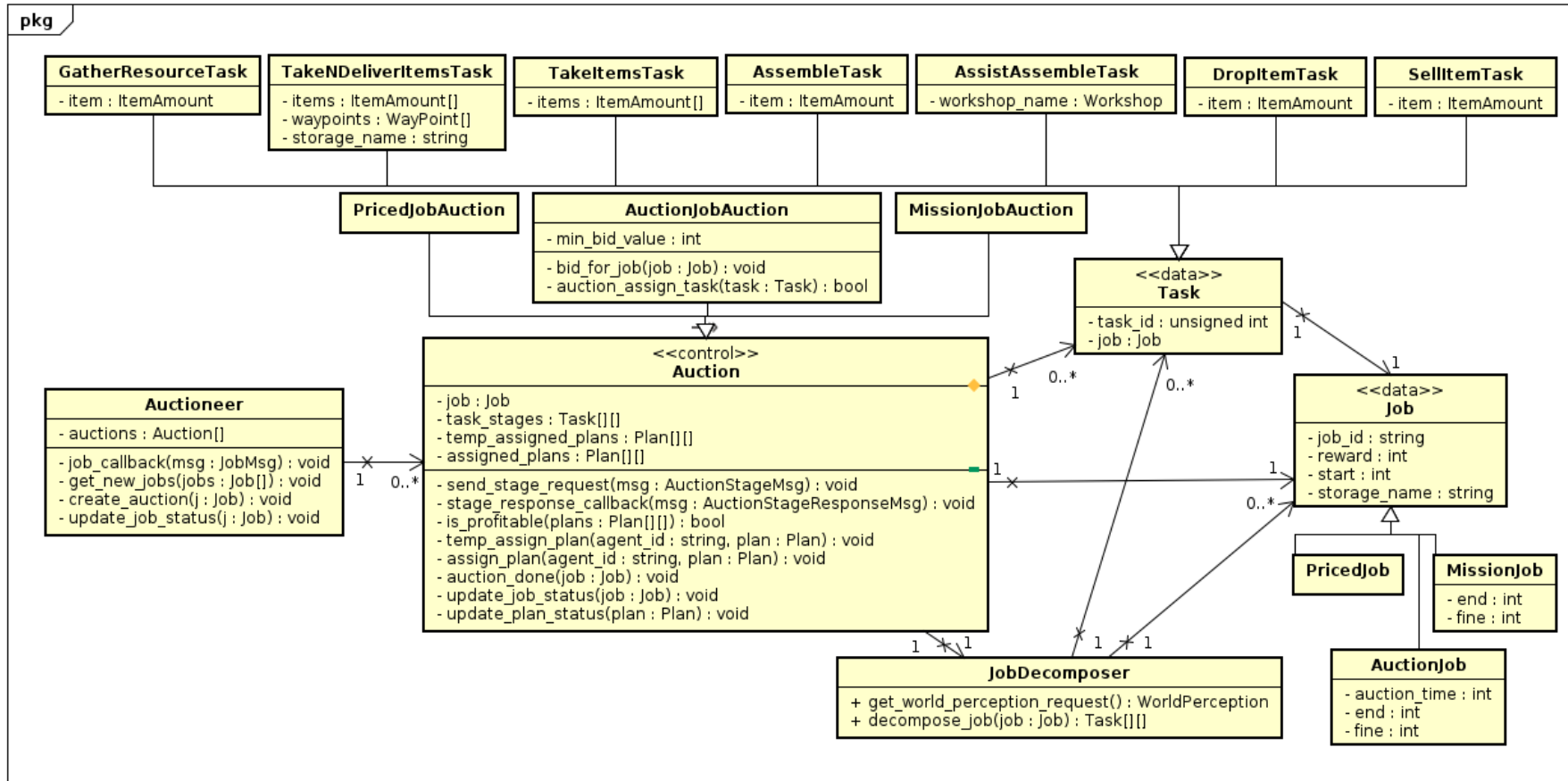




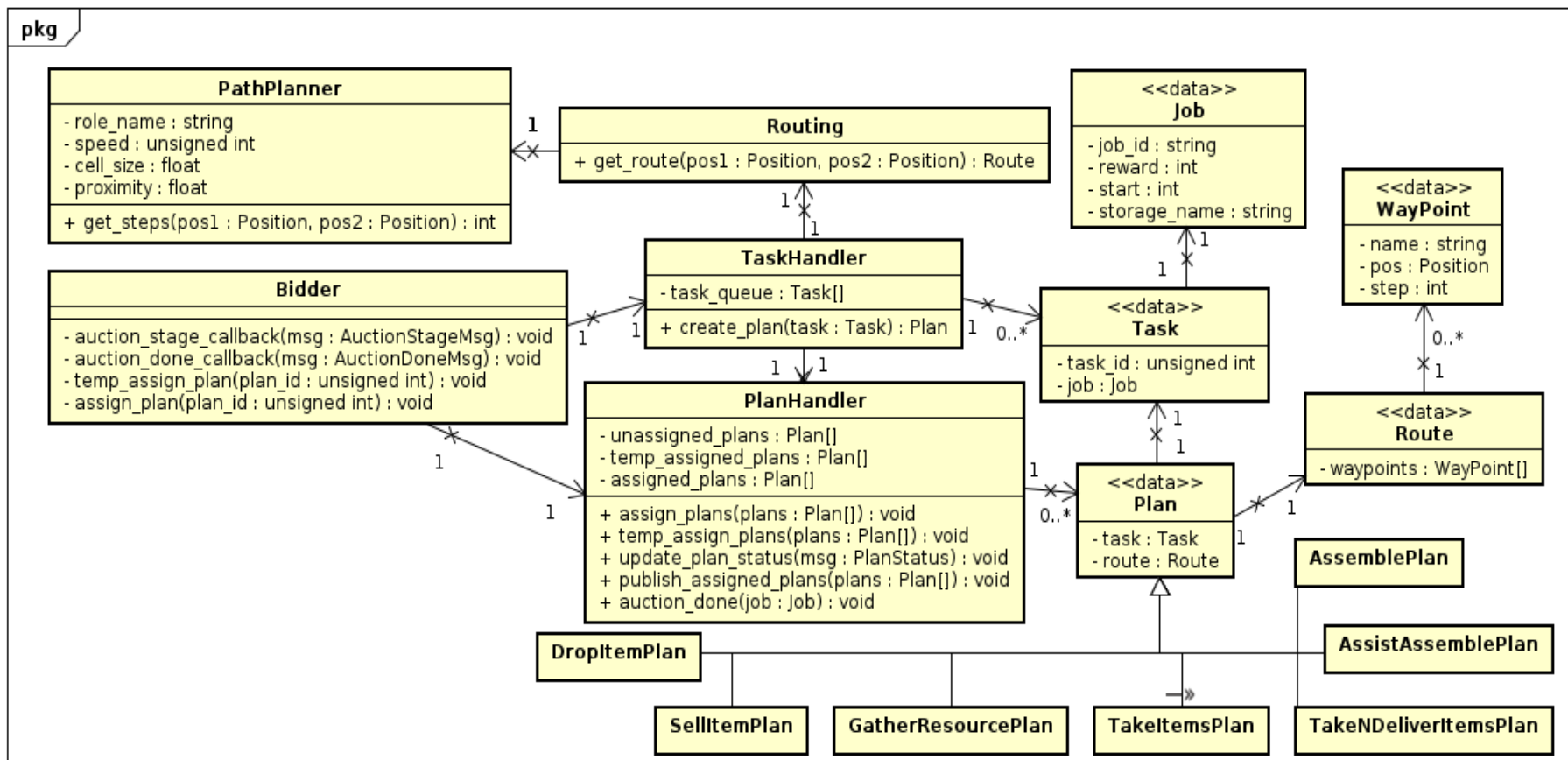
System Architecture and Data Flow



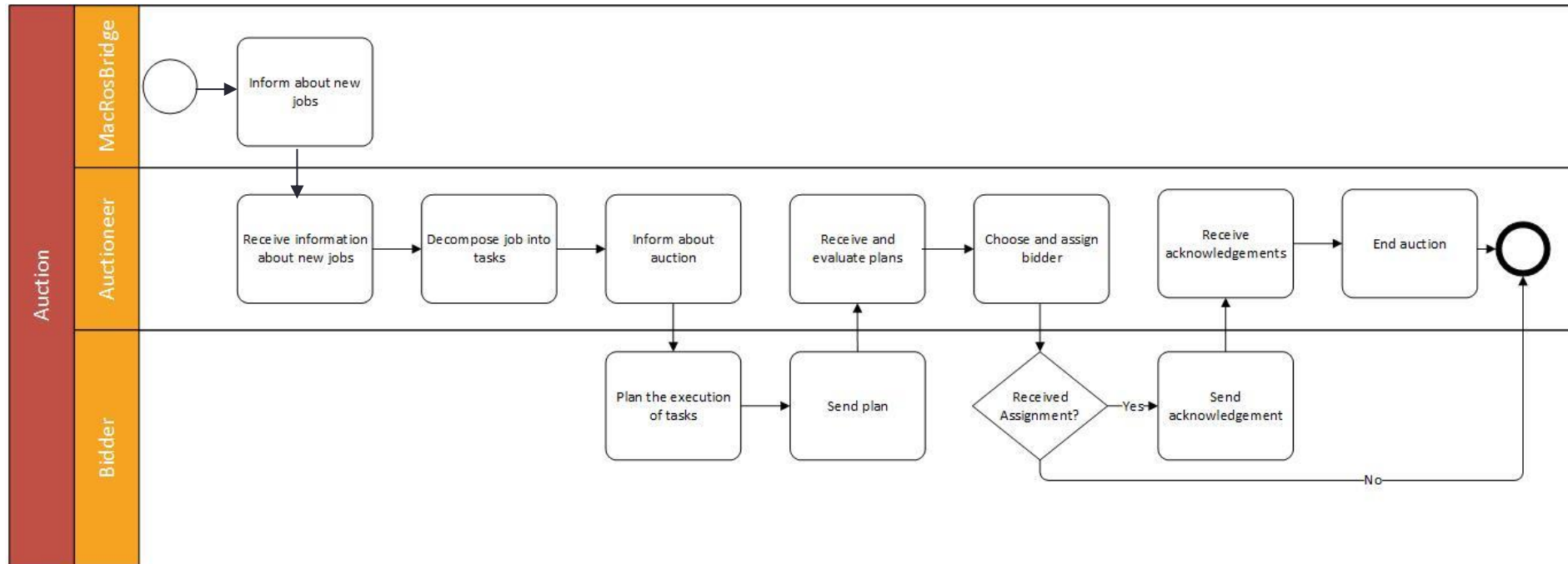
Class Diagram Agent



Class Diagram Auctioneer



3. Implementation Concept - Auctioning



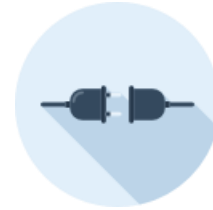
4. Current state

- Established Graphhopper access
- Improve exploration
 - Exploration grid
- Manager for perception handling
 - Save and update facilities
 - Save explored resource node
 - Collect information of all agents



4. Current state

- Improve charging
 - Charge at the closest charging station
 - Establish the distance as the number of steps



4. Current state



- Auctioning
 - Set up a node for the bidder and for the auctioneer
 - Select corresponding jobs
 - Broadcast requests

5. Team Structure

Josephine Krause

Group coordinator

Main responsibilities:

- Monitoring of progress and issues concerning programming and documentation tasks
- Preparation of the weekly progress

Marc Schmidt

Head of programming

Main responsibilities:

- Having the authority over decisions concerning the programming
- Look into the changes made in the code by the other group members and point out if something is still improvable

Muzammal Hussain

Scientist

Main responsibilities:

- Do research if necessary so all decisions can be made reasonably

References and Acknowledgements

- Icons made by Smartline, DinosoftLabs, Smashicons, Freepik, Vectors Market and Maxim Basinski from www.flaticon.com
- <https://multiagentcontest.org/>